



Early Journal Content on JSTOR, Free to Anyone in the World

This article is one of nearly 500,000 scholarly works digitized and made freely available to everyone in the world by JSTOR.

Known as the Early Journal Content, this set of works include research articles, news, letters, and other writings published in more than 200 of the oldest leading academic journals. The works date from the mid-seventeenth to the early twentieth centuries.

We encourage people to read and share the Early Journal Content openly and to tell others that this resource exists. People may post this content online or redistribute in any way for non-commercial purposes.

Read more about Early Journal Content at <http://about.jstor.org/participate-jstor/individuals/early-journal-content>.

JSTOR is a digital library of academic journals, books, and primary source objects. JSTOR helps people discover, use, and build upon a wide range of content through a powerful research and teaching platform, and preserves this content for future generations. JSTOR is part of ITHAKA, a not-for-profit organization that also includes Ithaka S+R and Portico. For more information about JSTOR, please contact support@jstor.org.

JULY 3.

The President, Dr. RUSCHENBERGER, in the chair.

Fifteen members present.

Protovermiculite, a New Mineral Species.—Professor GEO. A. KÖNIG described a micaceous mineral from Magnet Cove, Ark., to which he gave the name Protovermiculite, in preference to that of Hydrophilite, a name already existing in the list of mineralogic synonyms. The mineral occurs in large foliated plates, loose in the soil, and also in smaller prismatic crystals, with Appatite in the black garnet, of the same locality. The structure is strongly micaceous, the habitus hexagonal; but optically biaxial, and hence, as all biaxial micas, probably *monosymmetric*. The angle of the optical axis is very small, the hyperbolas touching each other. Thin laminae are slightly flexible, though without elasticity. Cleavage is less marked than in micas generally. The color is grayish-green in the interior of the plates, yellowish-silvery to bronze color on the outside. Thin laminae transmit brownish-green light. Hardness a little below 2. Lustre submetallic, and touch somewhat unctuous. Spec. gr. = 2.269. Before the blow-pipe it exfoliates slightly, and fuses at 4 to a black glass. Yields much water in the closed tube. No characteristic reactions with the fluxes. Strong sulphuric acid attacks the powdered mineral vehemently, causing complete decomposition, while flocculent silica separates; hydrochloric acid also effects decomposition. The finely pulverized mineral, placed in an air-tight space over oil of vitriol, loses 20.3 per cent. of water in 24 hours, when the weight remains constant; the water is reabsorbed in less than one hour in contact with the atmosphere. A larger quantity of water is not absorbed, even when placed in a saturated atmosphere. There seems to be a ground for this behavior, although hidden at present. Why are other micaceous minerals, much more cleavable than the vermiculites, and furnished with more capillary spaces, not at all hygroscopic? It may be supposed that a force of attraction other than a mere physical or rather mechanical one must exist in the latter. However, the author is in accord with Prof. J. P. Cooke, Jr.'s, views regarding the cause of exfoliation in vermiculite minerals and crystals of artificial compounds. (*Am. Acad., Boston*, 1874.) Prof. Cooke attributes exfoliation to the escape of the water of crystallization causing the structure of a mineral to break up. Some substances loose their water of crystallization without forcible means, over sulphuric acid, for instance, and their structure is not broken up; yet they do not reabsorb the lost water. Sodium carbonate and the sulphates $\text{RSO}_4 + 12 \text{ aq}$

may be cited in this connection. Evidently there is here a broad field for study of the underlying laws. Still Prof. Cooke's hypothesis is accepted for the present, as far as it regards the vermiculites. The present case of Protovermiculite gives it support. Here are two micas, presenting, as will be shown further on, an identical composition, qualitatively and quantitatively, having nearly equal quantities of water. Exposed to strong heat the one increases its volume tenfold by exfoliation, the other hardly doubles it. But when it is found that the former retains over oil of vitriol 11 per cent. of water, whilst the latter only retains 3.36 per cent. under the same conditions, their differing behavior may be accounted for to a certain extent, on the assumption that this water is essential to the structure; the remaining water being accidental moisture.

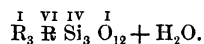
Composition of the Protovermiculite was found to be in several analyses (the greenish part differs from the silver-white or bronze only by a few tenths of per cent. of ferrous oxide):—

	Oxygen.		Atomic quotients.
SiO ₂ = 33.28	17.738	Si = 15.55	0.555
Al ₂ O ₃ = 14.88	6.934	Al = 7.95	0.145
Fe ₂ O ₃ = 6.36	1.908	Fe = 4.45	0.089
FeO = 0.57	0.125	Fe = 0.45	} 0.184
MgO = 21.52	8.510	Mg = 13.01	
H ₂ O (of crystall.) = 3.36			6.550
H ₂ O (hygrosco.) = 20.54			0.181
MnO = trace.			
TiO ₂ = trace.			
	100.51		

Dividing with 0.184 (Al + Fe) into the other atomic quotients, the ratio is obtained:—

$$\text{Si} : \text{Al} : \text{Mg} : \text{O} : \text{H}_2\text{O} = 3.01 : 1.00 : 2.989 : 11.918 : 0.983$$

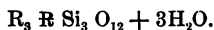
corresponding absolutely with the symbol—



The mica from Culsagee, North Carolina, described by Prof. Cooke (*loco cit.*), as *Culsageeite*, is composed as follows, according to closely agreeing analyses by himself, Dr. Thos. M. Chatard and the author (F. A. Genth, Corundum, *Proc. Am. Philos. Soc. of Philadelphia*, 1873), and after deducting the water lost over sulphuric acid:—

Culsageeite (Cooke).	Protovermiculite (König) after treat- ment over SO ₄ H ₂ .
SiO ₂ = 37.58	41.62
Al ₂ O ₃ = 19.73	18.60
Fe ₂ O ₃ = 5.95	7.25
FeO = 0.58	0.71
MgO = 25.13	26.90
H ₂ O = 11.09	4.20

The ratio of Culsageeite corresponds closely to the symbol—



It might seem that a difference of two molecules of water were not sufficient basis for a separation into two species. Yet when the important rôle which this water plays in the process of exfoliation is considered, and that Culsageeite exfoliates about ten times stronger than Protovermiculite, with an otherwise identical composition, the author is of opinion that strict science requires a separation. The name was chosen to indicate the imperfect vermiculation as compared with the other members of this group.

On the atomic ratio of Jefferisite, this most characteristic vermiculating mineral, there existed some uncertainty in the mind of the author, since the analyses made by Prof. Brush, Dr. Chatard, and himself do not quite agree, and yield atomic quotients quite unsatisfactory. In connection with the above investigation it was thought important to analyze the West Chester mineral once more, with the greatest care possible. 0.5 gr. of the finely pulverized mineral was placed in an air-tight bell-jar over sulphuric acid. In two days it lost 0.054 gr. or 10.8 per cent. It was kept for eight days longer, and weighed every second day, the weight remained absolutely constant. The same substance was then allowed to reabsorb the hygroscopic water by exposure to the air, and afterwards placed in an air-bath at a temperature of 106 C° for 18 hours, when it only lost 8.6 per cent.

The air-dry substance gave—

SiO ₂	=	33.03	Si	=	0.555
Al ₂ O ₃	=	17.38	Al	=	0.1690
Fe ₂ O ₃	=	7.41	Fe	=	0.0463
FeO	=	1.44	Fe	=	0.0210
MgO	=	20.16	Mg	=	0.5042
H ₂ O	=	20.90	H ₂ O	=	0.561 (dried over SO ₄ H ₂)
			H ₂ O	=	0.683 (dried at 106 C°)
		100.59			

Dividing by 0.2153 (Al + Fe) we obtain—

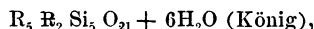
$$Si : R : R : H_2O = 2.58 : 1.00 : 2.44 : 2.91 : (3.17) \\ = 5.16 : 2.00 : 4.88 : 5.82 : (6.34).$$

(1) Brush's analysis (*Am. Journ. Sci.*, 1861); (2) Dr. Thos. M. Chatard's analysis (*Genth on Corundum l. c. supra*); and (3) the author's (*ibidem*) give the following ratios:—

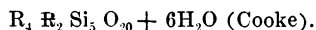
	Si	: R	: R
Brush	5.228	: 2	: 4.416
Chatard	5.412	: 2	: 4.928
König, 1st	5.054	: 2	: 4.736
“ 2d	5.16	: 2	: 4.88

Prof. J. P. Cooke deduced from the first ratio the formula $R_4 R_2 Si_5 O_{20}$, omitting the nearly half atom of R in excess of 4. This makes the mineral a true orthosilicate, and is quite satisfactory. But does the analytical result justify such a course? Only on the

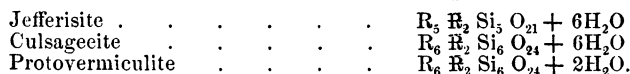
supposition that the analyzed material was heterogeneous. On the other hand, the two analyses by the author, made five years apart, and on quite different material, agreeing so well among themselves, point very strongly to the fact that instead of omitting the half atom, it has to be increased to a whole atom, and the formula of Jefferisite is therefore to be written—



instead of—



By doubling the molecules of Culsageeite and Protovermiculite their close affinity to Jefferisite is still more perceptible:—



Jefferisite and Culsageeite exfoliate with equal energy; the author is inclined to write the formulas of the three species in the above manner as a consequence, on mechanical principles.

JULY 10.

The President, Dr. RUSCHENBERGER, in the chair.

Twenty-four members present.

The death of David S. Brown was announced.

JULY 17.

The President, Dr. RUSCHENBERGER, in the chair.

Thirteen members present.

The resignation of Dr. Henry H. Smith, as a member, was read and accepted.

JULY 24.

The President, Dr. RUSCHENBERGER, in the chair.

Nine members present.

Note on Color Variation in Mammals.—Mr. J. A. RYDER called attention to the fact that many animals, when long domesticated, as the horse, ox, dog, and cat, were frequently asymmetrically colored. Horses were often seen with one white foot, or in extreme cases with three, while the white color sometimes extended further up the limb upon one side than upon the other. He had